

REMARKS

This is in full and timely response to the Office Action mailed on April 15, 2009.

Claims 7, 16 and 19-34 are currently pending in this application, with claims 7, 16 and 19 being independent.

No new matter has been added.

Reexamination in light of the following remarks is respectfully requested.

Entry of amendment

This amendment *prima facie* places the case in condition for allowance. Alternatively, it places this case in better condition for appeal.

Accordingly, entry of this amendment is respectfully requested.

Prematureness

Applicant, seeking review of the prematureness of the final rejection within the Final Office Action, respectfully requests reconsideration of the finality of the Final Office Action for the reasons set forth hereinbelow. See M.P.E.P. §706.07(c).

At least for the following reasons, if the allowance of the claims is not forthcoming at the very least and a new ground of rejection made, then a **new non-final Office Action** is respectfully requested.

Rejections under 35 U.S.C. §112

Rejection of claims 20, 24 and 25 - While not conceding the propriety of these rejections and in order to advance the prosecution of the present application, claims 20, 24 and 25 have been amended.

Withdrawal of these rejections is respectfully requested.

Rejection under 35 U.S.C. §103

Page 2 of the Office Action includes a rejection of claims of the Office Action refers to the "Background Art" of the specification for the present application (AAPA) and U.S. Patent No. 5,708,291 (Bohr) in rejecting claims 7, 16 and 19-34 under 35 U.S.C. §103.

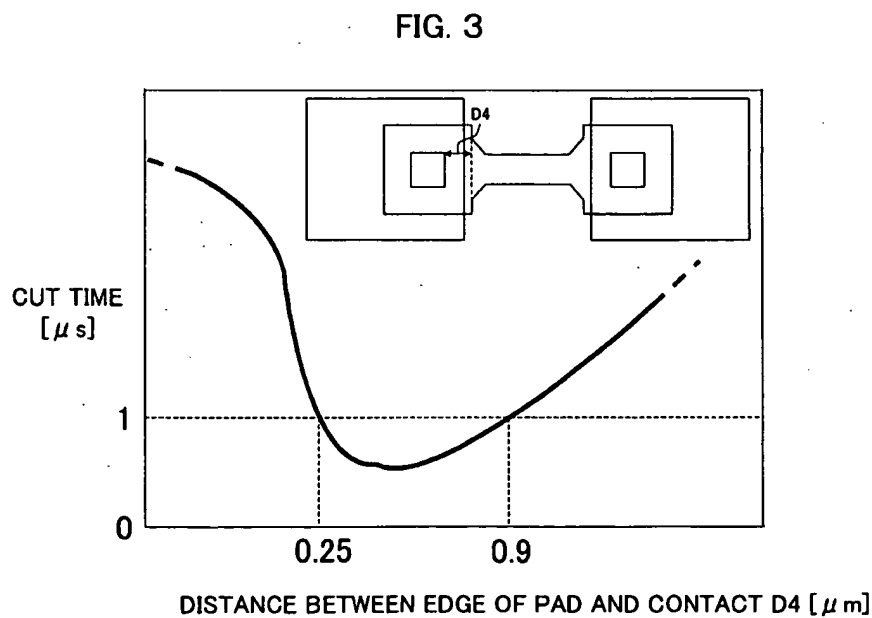
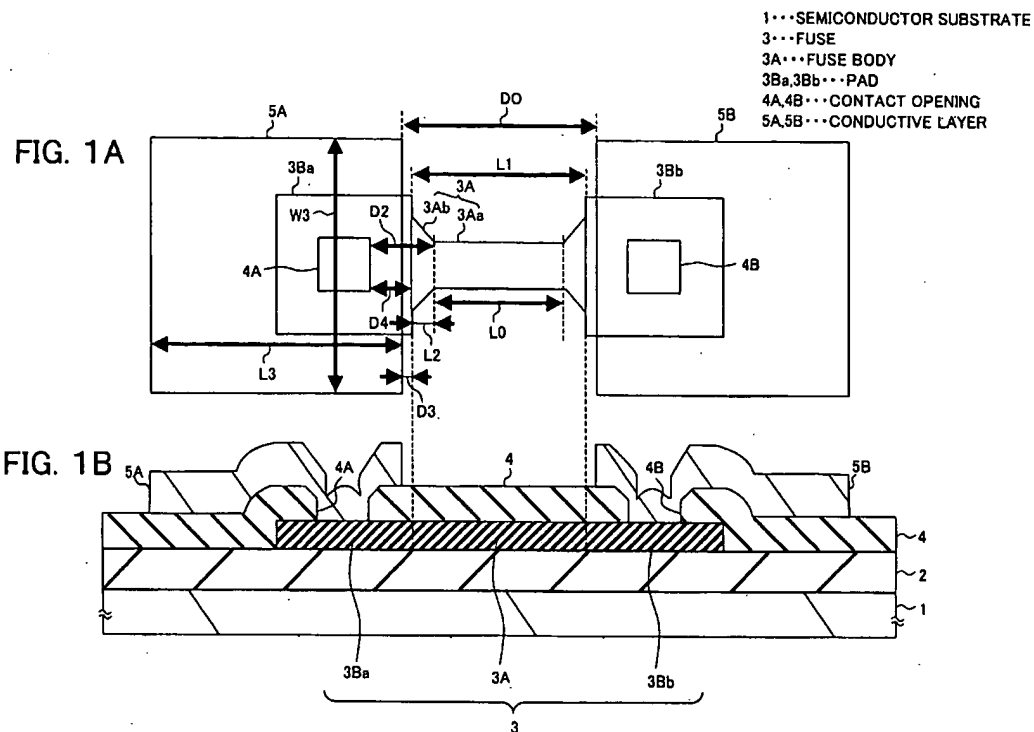
This rejection is traversed at least for the following reasons.

Rejection of claim 7 - Claim 7 is drawn to a semiconductor device comprising a fuse (3) having a fuse body (3A) and two pads (3Ba, 3Bb) connected by the fuse body (3A) and two conductive layers (5A, 5B) individually connected to two pads (3Ba, 3Bb), the above being formed inside a multilayer structure on a semiconductor substrate (1),

characterized in that a length (L1) of the fuse body (3A) is defined so that the melting location of the fuse (3) becomes positioned in the fuse body (3A) away from a region overlapped on the conductive layers (5A, 5B) when an electrical stress is applied between the two conductive layers (5A, 5B) to melt the fuse (3); and

in at least one of the above two conductive layers (5A, 5B), a distance (D4) from the contact regions (4A, 4B) connecting the conductive layers (5A, 5B) and the pads (3Ba, 3Bb) to edges of the pad (3Ba, 3Bb) contacting the fuse body (3A) is 0.25 μm to 0.90 μm .

Figures 1A, 1B and 3 of the specification as originally filed are provided hereinbelow.



Within claim 7, in at least one of the above two conductive layers (5A, 5B), a distance (D4) from the contact regions (4A, 4B) connecting the conductive layers (5A, 5B) and the pads (3Ba, 3Bb) to the pad (3Ba, 3Bb) edges contacting the fuse body (3A) is 0.25 μm to 0.90 μm .

AAPA - The Office Action readily admits that AAPA fails to disclose a distance from the contact regions (103A, 1035B) connecting the conductive layers (104A, 104B) and the pads (102Ba, 102Bb) to edges of the pad contacting the fuse body (3A) is 0.25 to 0.90 μm (Office Action at page 3).

Bohr - Figure 1B of Bohr is provided hereinbelow.

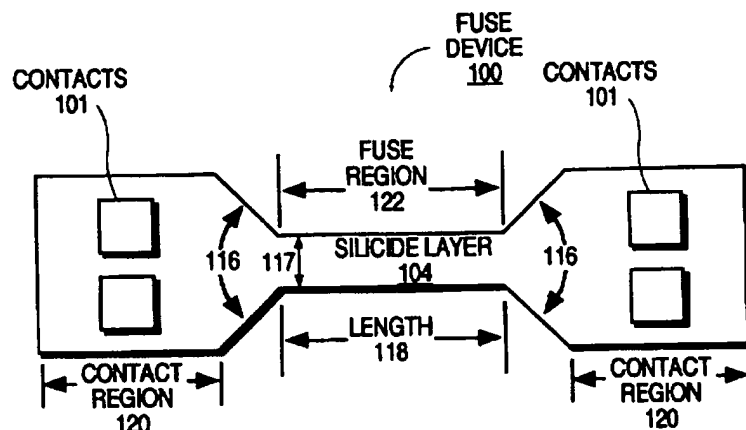


FIG. 1B

Bohr arguably discloses that in one embodiment, the WIDTH 117 of the fuse region from the top view shown in FIG. 1B is close to the lower limit of the process technology used to form the fuse device 100, about 0.22 microns in one example, and the LENGTH 118 is between four to twenty-five times the WIDTH 117 of the fuse region 122 (Bohr at column 3, line 63 to column 4, line

3). In a particular embodiment, the LENGTH 118 is about 10 times the WIDTH 117, but may be larger or smaller in other embodiments (Bohr at column 4, lines 3-5).

It is well-settled that arguments based on the measurement of a drawing *are of little value* absent any written description in the specification of the quantitative values allegedly shown within the drawings. *In re Wright*, 569 F.2d 1124, 1127, 193 USPQ 332, 335 (CCPA 1977).

Here, Figure 1B of Bohr arguably depicts the presence of contacts 101, contact regions 120, and a fuse region 122.

However, the Office Action fails to identify any written description in the specification of Bohr for the teaching of a distance from the contacts 101 to the fuse region 122 being 0.25 μm to 0.90 μm .

Instead, Bohr is silent regarding any distance from the contacts 101 to the fuse region 122.

In the absence of any supporting evidence, page 4 of the Office Action can only proffer that:

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize a distance from the contact regions connecting the conductive layers and the pads to edges of the pad contacting the fuse body to 0.25 to 0.90 μm without cause for undue experimentation. “[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.” *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) *see* MPEP 2144.05.

In response to this “scale of the drawings” argument presented within the Office Action, it is well established under U.S. patent practice and procedures that drawings do not define the

precise proportions of the elements and may not be relied on to show particular sizes if the specification is completely silent on the issue. *Hockerson-Halberstadt Inc. v. Avia Group International Inc.*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000). See M.P.E.P. §2125 (*proportions of features in a drawing are not evidence of actual proportions when drawings are not drawn to scale*).

Here, the specification of Bohr **fails** to disclose Figure 1B or any of the other drawing figures as being drawn to scale.

Instead, a review of Bohr would have revealed the disclosure as being **completely silent** on the issue of “*the distance from the contacts 101 to the fuse region 122*”. Accordingly, “*the general conditions*” regarding a measurement of the distance from the contacts 101 to the fuse region 122 are **not present** within Bohr.

As a consequence, Bohr **fails** to disclose, teach, or suggest a distance from the contacts 101 to the fuse region 122 as being is 0.25 μm to 0.90 μm .

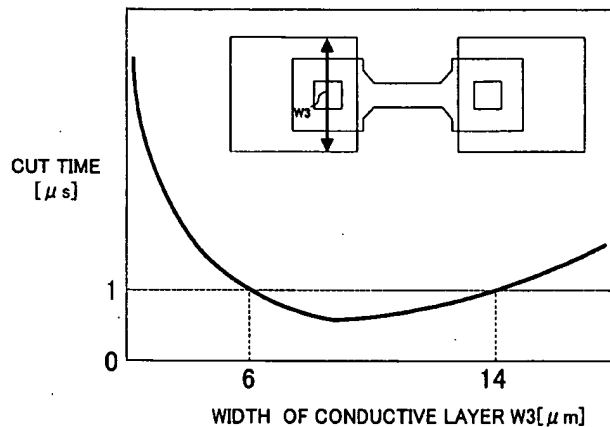
- ***Thus, AAPA and Bohr, either individually or as a whole, fail to show as teaching that the distance from the contact regions connecting the conductive layers and the pads to the pad edges contacting the fuse body is 0.25 μm to 0.90 μm .***

Claim 16 - Claim 16 is drawn to a semiconductor device comprising a fuse (3) including a conductive material in a multilayer structure on a semiconductor substrate (1), said fuse (3) having a fuse body (3A) and two pads (3Ba, 3Bb) connected by the fuse body (3A), conductive layers (5A, 5B) connected one by one to said two pads (3Ba, 3Bb),

characterized in that, in at least one of the above two conductive layers (5A, 5B), a width (W3) of the portions of the conductive layers (5A, 5B) including the contact regions (4A, 4B) with the pads (3Ba, 3Bb) is 6 μm to 14 μm .

Figure 2 of the specification as originally filed is provided hereinbelow.

FIG. 2



AAPA - The Office Action readily admits that AAPA fails to disclose that the width of the portions of the conductive layers including the contact regions with the pads is 6 μm to 14 μm (Office Action at page 8).

Bohr - The Office Action attempts to associate contacts 101 of Bohr with the claimed pad (Office Action at page 5).

Nevertheless, the Office Action contends that Bohr further discloses the width of the portion of the conductive layers including the contact regions (120) with pads (101) can vary (col 4, lines 6-10).

In response, the paragraph within Bohr at column 4, lines 6-20 is as follows:

The contact region 120 is as small as possible in one embodiment, while still providing the minimum area required by contacts 101 based on their size, composition, and the programming current or voltage required to program the fuse device 100. The number of contacts 101 on the fuse device 100 may vary. Although two contacts 101 are shown at either end of the fuse device 100 in FIG. 1B, a larger

or smaller number of contacts may also be used in accordance with the invention. In one embodiment, shown in FIG. 7 each of the contact regions 120 on either end of the fuse device 101 includes nine contacts 700. Multiple contacts 101 operating in parallel may be used to ensure that the required programming current flows through the fuse device 100 without overheating the contacts 101.

Here, Bohr fails to disclose the width of the contact regions 120 being 6 μm to 14 μm .

In the absence of any supporting evidence, page 5 of the Office Action can only proffer that:

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm without cause for undue experimentation.

“[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation.”

In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) see MPEP 2144.05.

In response to this “*scale of the drawings*” the specification of Bohr fails to disclose Figure 1B or any of the other drawing figures as being drawn to scale.

Instead, a review of Bohr would have revealed the disclosure as being completely silent on the issue of “*the width of the contact regions 120*”. Accordingly, “*the general conditions*” regarding the width of the contact regions 120 are not present within Bohr.

As a consequence, Bohr fails to disclose, teach, or suggest a width of the portions of the silicide layer 104 disposed on the polysilicon layer 105 including the contact region 120 with the contacts 101 is 6 μm to 14 μm .

- ***Thus, AAPA and Bohr, either individually or as a whole, fail to disclose, teach, or suggest a device characterized in that, in at least one of the above two conductive layers (5A, 5B), a width (W3) of the portions of the conductive layers (5A, 5B) including the contact regions (4A, 4B) with the pads (3Ba, 3Bb) is 6 μm to 14 μm .***

Withdrawal of the rejections is respectfully requested.

Claims 19-34 - Claims 20-34 are dependent upon claim 19. Claim 19 is drawn to a semiconductor device comprising:

a fuse body (3A) connected to a pad (3Ba), said fuse body (3A) including a fuse line (3Aa) and two connections (3Ab);

an inter-layer insulating film (4) on said pad (3Ba), an opening (4A) through said inter-layer insulating film (4) exposing said pad (3Ba);

a conductive layer (5A) on said inter-layer insulating film (4), said conductive layer (5A) within said opening (4A) being electrically connected to said pad (3Ba),

wherein at least one of the following is present:

(a) the width (W3) of said conductive layer (5A) is 6 μm to 14 μm ,

(b) the distance (D4) between said fuse line (3Aa) and said opening (4A) is 0.25 μm to 0.90 μm ,

(c) the length (L1) of the fuse body (3A) is 1.8 μm to 20 μm .

AAPA - The Office Action readily admits that AAPA fails to disclose that the width of the portions of the conductive layers including the contact regions with the pads is 6 μm to 14 μm (Office Action at page 6).

The Office Action readily admits that AAPA fails to disclose a distance from the contact regions (103A, 1035B) connecting the conductive layers (104A, 104B) and the pads (102Ba, 102Bb) to edges of the pad contacting the fuse body (3A) is 0.25 to 0.90 μm (Office Action at page 6).

The Office Action readily admits that AAPA fails to disclose that the length of the fuse body is 1.8 μm to 20 μm (Office Action at page 7).

Bohr - Page 6 of the Office Action contends that:

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize the width of the portions of the conductive layers including the contact regions with the pads to 6 to 14 μm without cause for undue experimentation.

Page 7 of the Office Action contends that:

Based on the scale of the drawings, the dimensions provided, and the discussion that the dimensions can vary, one of ordinary skill in the art would have been motivated to optimize a distance from the contact regions connecting the conductive layers and the pads to edges of the pad contacting the fuse body to 0.25 to 0.90 μm without cause for undue experimentation.

In response to this “*scale of the drawings*” the specification of Bohr fails to disclose Figure 1B or any of the other drawing figures as being drawn to scale.

Instead, a review of Bohr would have revealed the disclosure as being completely silent on the issue of “*the distance from the contacts 101 to the fuse region 122*”.

Additionally, a review of Bohr would have revealed the disclosure as being completely silent on the issue of “*the width of the contact regions 120*”.

Claim 19 provides for a fuse body (3A) connected to a pad (3Ba), said fuse body (3A) including a fuse line (3Aa) and two connections (3Ab). Within claim 19, (c) the length (L1) of the fuse body (3A) is 1.8 μm to 20 μm .

Figure 1B of Bohr is provided hereinbelow.

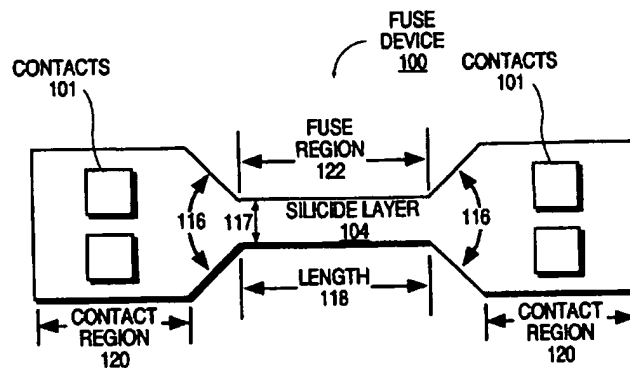


FIG. 1B

Regarding Figure 1B, Bohr arguably discloses that the fuse device 100 may also include tapered transitional regions 116 between either end of the fuse region 122 and the respective contact region 120.

Page 7 of the Office Action contends that Bohr teaches a fuse body including a fuse line (122) and two connections (116).

However, Bohr fails to disclose, teach, or suggest a dimensional length based upon the combined length of the tapered transitional regions 116 and the fuse region 122.

Instead, Bohr merely discloses that in one embodiment, the width 117 of the fuse region from the top view shown in FIG. 1B is close to the lower limit of the process technology used to form the fuse device 100, about 0.22 microns in one example, and the LENGTH 118 is between four to twenty-five times the WIDTH 117 of the fuse region 122 (Bohr at column 3, line 63 to column 4, line 3).

Accordingly, “*the general conditions*” regarding the length a fuse body are not present within Bohr, the alleged fuse body of Bohr being described within the Office Action as the fuse line (122) and two connections (116).

- *Thus, AAPA and Bohr, either individually or as a whole, fail to disclose, teach, or suggest a device wherein at least one of the following is present:*

(a) the width (W3) of said conductive layer (5A) is 6 μm to 14 μm ,

(b) the distance (D4) between said fuse line (3Aa) and said opening (4A) is 0.25 μm to 0.90 μm ,

(c) said length (L1) of the fuse body (3A) is 1.8 μm to 20 μm .

Allowance of the claims is respectfully requested.

Official Notice

There is no concession as to the veracity of Official Notice, if taken in any Office Action.

An affidavit or document should be provided in support of any Official Notice taken. 37 CFR 1.104(d)(2), MPEP § 2144.03. See also, *Ex parte Natale*, 11 USPQ2d 1222, 1227-1228 (Bd. Pat. App. & Int. 1989)(failure to provide any objective evidence to support the challenged use of Official Notice constitutes clear and reversible error).

Extensions of time

Please treat any concurrent or future reply, requiring a petition for an extension of time under 37 C.F.R. §1.136, as incorporating a petition for extension of time for the appropriate length of time.

Fees

The Commissioner is hereby authorized to charge any deficiency in fees filed, asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm).

The Commissioner is hereby authorized to charge all required fees, fees under 37 C.F.R. §1.17, or all required extension of time fees.

If any fee is required or any overpayment made, the Commissioner is hereby authorized to charge the fee or credit the overpayment to Deposit Account # 18-0013.

Conclusion

This response is believed to be a complete response to the Office Action.

Applicants reserve the right to set forth further arguments supporting the patentability of their claims, including the separate patentability of the dependent claims not explicitly addressed herein, in future papers.

For the foregoing reasons, all the claims now pending in the present application are allowable, and the present application is in condition for allowance.

Accordingly, favorable reexamination and reconsideration of the application in light of the remarks is courteously solicited.

If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone Brian K. Dutton, Reg. No. 47,255, at 202-955-8753.

Dated: May 27, 2009

Respectfully submitted,

By  40,290

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